

days to come into compliance with any perceived signal quality problems which need to be corrected. The Commission may request cable operators to test their systems at any time.

NOTE 2 TO § 76.601: Section 76.1717 contains recordkeeping requirements for each system operator in order to show compliance with the technical rules of this subpart.

NOTE 3 TO § 76.601: Section 76.1704 contains recordkeeping requirements for proof of performance tests.

[65 FR 53615, Sept. 5, 2000]

§ 76.602 Incorporation by reference.

(a) The materials listed in this section are incorporated by reference in this part. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of the approval, and notice of any change in these materials will be published in the FEDERAL REGISTER. The materials are available for purchase at the corresponding addresses as noted, and all are available for inspection at the Federal Communications Commission, 445 12th. St., SW., Reference Information Center, Room CY-A257, Washington, DC 20554 and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(b) The following materials are available for purchase from at least one of the following addresses: Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112 or at <http://global.ihs.com>; or American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036 or at <http://webstore.ansi.org/ansidocstore/default.asp>; or Society of Cable Telecommunications Engineers at <http://www.scte.org/standards/index.cfm>; or Advanced Television Systems Committee, 1750 K Street, NW., Suite 1200, Washington, DC 20006 or at <http://www.atsc.org/standards>.

(1) ANSI/SCTE 26 2001 (formerly DVS 194): "Home Digital Network Interface Specification with Copy Protection," 2001, IBR approved for § 76.640.

(2) SCTE 28 2003 (formerly DVS 295): "Host-POD Interface Standard," 2003, IBR approved for § 76.640.

(3) SCTE 41 2003 (formerly DVS 301): "POD Copy Protection System," 2003, IBR approved for § 76.640.

(4) ANSI/SCTE 54 2003 (formerly DVS 241), "Digital Video Service Multiplex and Transport System Standard for Cable Television," 2003, IBR approved for § 76.640.

(5) ANSI/SCTE 65 2002 (formerly DVS 234), "Service Information Delivered Out-of-Band for Digital Cable Television," 2002, IBR approved for § 76.640.

(6) CEA-931-A, "Remote Control Command Pass-through Standard for Home Networking," 2003, IBR approved for § 76.640.

(7) SCTE 40 2003 (formerly DVS 313), "Digital Cable Network Interface Standard," 2003, IBR approved for § 76.640.

(8) ATSC A/65B: "ATSC Standard: Program and System Information Protocol for Terrestrial Broadcast and Cable (Revision B)," March 18, 2003, IBR approved for § 76.640.

(9) CEA-542-B: "CEA Standard: Cable Television Channel Identification Plan," July 2003, IBR approved for § 76.605.

[68 FR 66734, Nov. 28, 2003, as amended at 69 FR 18803, Apr. 9, 2004; 69 FR 57861, Sept. 28, 2004]

§ 76.605 Technical standards.

(a) The following requirements apply to the performance of a cable television system as measured at any subscriber terminal with a matched impedance at the termination point or at the output of the modulating or processing equipment (generally the headend) of the cable television system or otherwise as noted. The requirements are applicable to each NTSC or similar video downstream cable television channel in the system:

(1)(i) The cable television channels delivered to the subscriber's terminal shall be capable of being received and displayed by TV broadcast receivers used for off-the-air reception of TV broadcast signals, as authorized under part 73 of this chapter; and

(ii) Cable television systems shall transmit signals to subscriber premises

equipment on frequencies in accordance with the channel allocation plan set forth in CEA-542-B: "Standard: Cable Television Channel Identification Plan," (Incorporated by reference, see § 76.602).

(2) The aural center frequency of the aural carrier must be 4.5 MHz \pm 5 kHz above the frequency of the visual carrier at the output of the modulating or processing equipment of a cable television system, and at the subscriber terminal.

(3) The visual signal level, across a terminating impedance which correctly matches the internal impedance of the cable system as viewed from the subscriber terminal, shall not be less than 1 millivolt across an internal impedance of 75 ohms (0 dBmV). Additionally, as measured at the end of a 30 meter (100 foot) cable drop that is connected to the subscriber tap, it shall not be less than 1.41 millivolts across an internal impedance of 75 ohms (+3 dBmV). (At other impedance values, the minimum visual signal level, as viewed from the subscriber terminal, shall be the square root of 0.0133 (Z) millivolts and, as measured at the end of a 30 meter (100 foot) cable drop that is connected to the subscriber tap, shall be 2 times the square root of 0.00662(Z) millivolts, where Z is the appropriate impedance value.)

(4) The visual signal level on each channel, as measured at the end of a 30 meter cable drop that is connected to the subscriber tap, shall not vary more than 8 decibels within any six-month interval, which must include four tests performed in six-hour increments during a 24-hour period in July or August and during a 24-hour period in January or February, and shall be maintained within:

(i) 3 decibels (dB) of the visual signal level of any visual carrier within a 6 MHz nominal frequency separation;

(ii) 10 dB of the visual signal level on any other channel on a cable television system of up to 300 MHz of cable distribution system upper frequency limit, with a 1 dB increase for each additional 100 MHz of cable distribution system upper frequency limit (e.g., 11 dB for a system at 301-400 MHz; 12 dB for a system at 401-500 MHz, *etc.*); and

(iii) A maximum level such that signal degradation due to overload in the subscriber's receiver or terminal does not occur.

(5) The rms voltage of the aural signal shall be maintained between 10 and 17 decibels below the associated visual signal level. This requirement must be met both at the subscriber terminal and at the output of the modulating and processing equipment (generally the headend). For subscriber terminals that use equipment which modulate and remodulate the signal (e.g., baseband converters), the rms voltage of the aural signal shall be maintained between 6.5 and 17 decibels below the associated visual signal level at the subscriber terminal.

(6) The amplitude characteristic shall be within a range of ± 2 decibels from 0.75 MHz to 5.0 MHz above the lower boundary frequency of the cable television channel, referenced to the average of the highest and lowest amplitudes within these frequency boundaries. The amplitude characteristic shall be measured at the subscriber terminal.

(7) The ratio of RF visual signal level to system noise shall not be less than 43 decibels. For class I cable television channels, the requirements of this section are applicable only to:

(i) Each signal which is delivered by a cable television system to subscribers within the predicted Grade B contour for that signal;

(ii) Each signal which is first picked up within its predicted Grade B contour;

(iii) Each signal that is first received by the cable television system by direct video feed from a TV broadcast station, a low power TV station, or a TV translator station.

(8) The ratio of visual signal level to the rms amplitude of any coherent disturbances such as intermodulation products, second and third order distortions or discrete-frequency interfering signals not operating on proper offset assignments shall be as follows:

(i) The ratio of visual signal level to coherent disturbances shall not be less than 51 decibels for noncoherent channel cable television systems, when measured with modulated carriers and time averaged; and

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(ii) The ratio of visual signal level to coherent disturbances which are frequency-coincident with the visual carrier shall not be less than 47 decibels for coherent channel cable systems, when measured with modulated carriers and time averaged.

(9) The terminal isolation provided to each subscriber terminal:

(i) Shall not be less than 18 decibels. In lieu of periodic testing, the cable operator may use specifications provided by the manufacturer for the terminal isolation equipment to meet this standard; and

(ii) Shall be sufficient to prevent reflections caused by open-circuited or short-circuited subscriber terminals from producing visible picture impairments at any other subscriber terminal.

(10) The peak-to-peak variation in visual signal level caused by undesired low frequency disturbances (hum or repetitive transients) generated within the system, or by inadequate low frequency response, shall not exceed 3 percent of the visual signal level. Measurements made on a single channel using a single unmodulated carrier may be used to demonstrate compliance with this parameter at each test location.

(11) As of June 30, 1995, the following requirements apply to the performance of the cable television system as measured at the output of the modulating or processing equipment (generally the headend) of the system:

(i) The chrominance-luminance delay inequality (or chroma delay), which is the change in delay time of the chrominance component of the signal relative to the luminance component, shall be within 170 nanoseconds.

(ii) The differential gain for the color subcarrier of the television signal, which is measured as the difference in amplitude between the largest and smallest segments of the chrominance signal (divided by the largest and expressed in percent), shall not exceed ±20%.

(iii) The differential phase for the color subcarrier of the television signal which is measured as the largest phase difference in degrees between each segment of the chrominance signal and reference segment (the segment at the

blanking level of 0 IRE), shall not exceed ±10 degrees.

(12) As an exception to the general provision requiring measurements to be made at subscriber terminals, and without regard to the type of signals carried by the cable television system, signal leakage from a cable television system shall be measured in accordance with the procedures outlined in § 76.609(h) and shall be limited as follows:

Frequencies	Signal leakage limit (micro-volt/meter)	Distance in meters (m)
Less than and including 54 MHz, and over 216 MHz	15	30
Over 54 up to and including 216 MHz	20	3

(b) Cable television systems distributing signals by using methods such as nonconventional coaxial cable techniques, noncoaxial copper cable techniques, specialized coaxial cable and fiber optical cable hybridization techniques or specialized compression techniques or specialized receiving devices, and which, because of their basic design, cannot comply with one or more of the technical standards set forth in paragraph (a) of this section, may be permitted to operate: Provided, That an adequate showing is made pursuant to § 76.7 which establishes that the public interest is benefited. In such instances, the Commission may prescribe special technical requirements to ensure that subscribers to such systems are provided with an equivalent level of good quality service.

NOTE 1: Local franchising authorities of systems serving fewer than 1000 subscribers may adopt standards less stringent than those in § 76.605(a). Any such agreement shall be reduced to writing and be associated with the system's proof-of-performance records.

NOTE 2: For systems serving rural areas as defined in § 76.5, the system may negotiate with its local franchising authority for standards less stringent than those in §§ 76.605(a)(3), 76.605(a)(7), 76.605(a)(8), 76.605(a)(10) and 76.605(a)(11). Any such agreement shall be reduced to writing and be associated with the system's proof-of-performance records.

NOTE 3: The requirements of this section shall not apply to devices subject to the TV interface device rules under part 15 of this chapter.

NOTE 4: Should subscriber complaints arise from a system failing to meet § 76.605(a)(6) prior to December 30, 1999, the cable operator will be required to provide a converter that will allow the system to meet the standard immediately at the complaining subscriber's terminal. Further, should the problem be found to be system-wide, the Commission may order all converters on the system be changed to meet the standard.

NOTE 5: Should subscriber complaints arise from a system failing to meet § 76.605(a)(10), the cable operator will be required to remedy the complaint and perform test measurements on § 76.605(a)(10) containing the full number of channels as indicated in § 76.601(b)(2) at the complaining subscriber's terminal. Further, should the problem be found to be system-wide, the Commission may order that the full number of channels as indicated in § 76.601(b)(2) be tested at all required locations for future proof-of-performance tests.

NOTE 6: No State or franchising authority may prohibit, condition, or restrict a cable system's use of any type of subscriber equipment or any transmission technology.

[37 FR 3278, Feb. 12, 1972]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 76.605 see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

§ 76.606 Closed captioning.

(a) As of June 30, 1992, the operator of each cable television system shall not take any action to remove or alter closed captioning data contained on line 21 of the vertical blanking interval.

(b) As of July 1, 1993, the operator of each cable television system shall deliver intact closed captioning data contained on line 21 of the vertical blanking interval, as it arrives at the headend or from another origination source, to subscriber terminals and (when so delivered to the cable system) in a format that can be recovered and displayed by decoders meeting § 15.119 of this chapter.

[57 FR 11003, Apr. 1, 1992]

§ 76.609 Measurements.

(a) Measurements made to demonstrate conformity with the performance requirements set forth in §§ 76.601 and 76.605 shall be made under conditions which reflect system performance during normal operations, including

the effect of any microwave relay operated in the Cable Television Relay (CARS) Service intervening between pickup antenna and the cable distribution network. Amplifiers shall be operated at normal gains, either by the insertion of appropriate signals or by manual adjustment. Special signals inserted in a cable television channel for measurement purposes should be operated at levels approximating those used for normal operation. Pilot tones, auxiliary or substitute signals, and nontelevision signals normally carried on the cable television system should be operated at normal levels to the extent possible. Some exemplary, but not mandatory, measurement procedures are set forth in this section.

(b) When it may be necessary to remove the television signal normally carried on a cable television channel in order to facilitate a performance measurement, it will be permissible to disconnect the antenna which serves the channel under measurement and to substitute therefor a matching resistance termination. Other antennas and inputs should remain connected and normal signal levels should be maintained on other channels.

(c) As may be necessary to ensure satisfactory service to a subscriber, the Commission may require additional tests to demonstrate system performance or may specify the use of different test procedures.

(d) The frequency response of a cable television channel may be determined by one of the following methods, as appropriate:

(1) By using a swept frequency or a manually variable signal generator at the sending end and a calibrated attenuator and frequency-selective voltmeter at the subscriber terminal; or

(2) By using either a multiburst generator or vertical interval test signals and either a modulator or processor at the sending end, and by using either a demodulator and either an oscilloscope display or a waveform monitor display at the subscriber terminal.

(e) System noise may be measured using a frequency-selective voltmeter (field strength meter) which has been suitably calibrated to indicate rms noise or average power level and which